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Math.
1964

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HIGH SCHOOL ENTRANCE EXAMINATION BOARD

DEPARTMENTAL EXAMINATIONS, 1964

GRADE IX

MATHEMATICS

Time — 2 hours.

DO NOT SPEND TOO MUCH TIME ON ANY ONE QUESTION.
READ THE QUESTIONS CAREFULLY.

Total Possible Mark — 167.

Finished work in this booklet may be done in either pencil or ink (blue or black).

For the first 18 questions, five solutions are given for each question, only one of which is correct. You are to circle the NUMBER of the correct answer with a pencil or pen.

From question 23 to the end of the paper partial marks will be given for correct method. For this reason all work should be shown in the space provided for the solution. NO MARKS WILL BE GIVEN FOR WORK IN THE SPACE MARKED "FOR ROUGH WORK".

When making constructions be sure to leave all construction lines in your diagram. DO NOT ERASE THEM. They indicate to the marker just how the construction was done.

DO NOT FOLD THE TEST BOOKLET.

PLACE THE TEST BOOKLET IN THE ENVELOPE. BE SURE TO SEAL THE ENVELOPE.

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Values

2 marks each

SECTION A

With a pencil or pen, circle the number of the correct answer in each of the following 18 questions. If you are not sure of the right answer, make the best choice you can. An example is:

The product of 3 and 12 is

1. 15 2. 123 [✓ 3.] 36
4. 9 5. 4

Since the correct answer is 36, the number 3 has been circled.

1. .25% of 432 is

1. 1. 108 2. 1.08 3. .108
4. 10,800 5. 1080

2. $(+3)(-a)^2$

2. 1. $-5a$ 2. $6a$ 3. $9a^2$
4. $3a^2$ 5. $-3a^2$

3. Which of these is an equation?

3. 1. $3x + 4y$ 2. $\frac{3x}{2} = 8$ 3. $2x + 3y - 5$
4. $x + x + 2x$ 5. $4(x)(y)$

4. $\frac{a}{b} + \frac{b}{c} =$

4. 1. $\frac{ac + b^2}{bc}$ 2. $\frac{a}{c}$ 3. $\frac{ab}{bc}$
4. $\frac{a + b}{b + c}$ 5. $\frac{a + b}{bc}$

5. In a triangle one angle is 54°. Which of the following could form the other two angles?

5. 1. 80°, 110° 2. 36°, 54° 3. 36°, 144°
4. 23°, 31° 5. 68°, 58°

6. The radius of the circular top of a tower is $4\frac{2}{3}$ yards. The area of the circular top is $(\pi = \frac{22}{7})$

6. 1. 44 sq. ft. 2. $14\frac{2}{3}$ sq. ft. 3. $68\frac{4}{9}$ sq. ft.
4. 616 sq. ft. 5. $229\frac{1}{3}$ sq. ft.

FOR ROUGH WORK

(No marks for work in this space.)

Values

7. $W = 110 - 5.5(60 - h)$
Where "W" is a boy's weight in pounds, and "h" his height in inches. According to this formula what will be the weight of a boy whose height is 4′6″?

7. 1. 75 2. 99 3. 79
4. 77 5. 88

8. $\frac{4x^9y^{10}}{12x^3y^5} =$

8. 1. $\frac{x^6y^5}{3}$ 2. $\frac{x^3y^2}{3}$ 3. $3x^3y^2$
4. $\frac{x^6y^2}{3}$ 5. $3x^3y^5$

9. The L.C.M. of 5, 8, and 12, is

9. 1. 12 2. 40 3. 120
4. 60 5. 80

10. Find the value of $(x - 2y)^2$ when $x = -8$ and $y = -2$.

10. 1. -16 2. 144 3. -8
4. -24 5. 16

11. $\frac{\frac{4}{5} - \frac{3}{4}}{\frac{5}{6} + \frac{3}{8}} =$

11. 1. $\frac{6}{145}$ 2. $\frac{6}{55}$ 3. $1\frac{3}{4}$
4. $\frac{19}{20}$ 5. $\frac{3}{16}$

12. Divide the difference of 36 and 27 into their product.

12. 1. $22\frac{10}{11}$ 2. 18 3. 36
4. 108 5. $29\frac{5}{11}$

13. If $\frac{2x}{4} = 4$ and $4y + 11 = 3$, then the numerical value of the expression $x^2 + 2xy$ is

13. 1. 96 2. 12 3. 32
4. -16 5. 48

FOR ROUGH WORK

(No marks for work in this space.)

Values

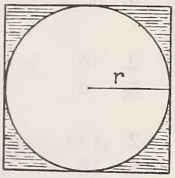
14. Simplify by collecting like terms: $(4x - 3y) - (5y - 2x)$

14. 1. $6x - 8y$ 2. $2x - 8y$
3. $6x + 2y$ 4. $2x - 2y$
5. $2x + 2y$

15. The face of an insurance policy on a house is \$6500 and the rate is 54¢ per \$100 for 3 years. What is the 3-year premium?

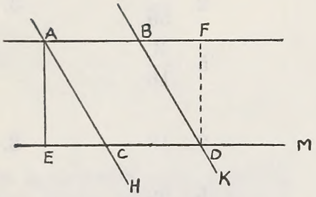
15. 1. \$105.30 2. \$87.75
3. \$35.10 4. \$11.70
5. \$351.00

16. The formula for the shaded part of this figure is



16. 1. $r(4 - \pi r)$ 2. $r^2(4 - \pi)$
3. $2r(r - \pi)$ 4. $r^2(4 + \pi)$
5. $r^2(1 - \pi)$

17.



$ABCD$ is a parallelogram
$BD = 10''$
$FD \doteq 8''$
$\angle FDM = 90°$ and $\angle AEC = 90°$
The length of EC is

17. 1. 8″ 2. 6″
3. 10″ 4. 18″
5. 4″

18. If $K = xy + 3$, then $x =$

18. 1. $\dfrac{K}{y+3}$ 2. $\dfrac{K+3}{y}$
3. $\dfrac{K}{y-3}$ 4. $\dfrac{K-3}{y}$
5. $K - y - 3$

FOR ROUGH WORK

(No marks for work in this space.)

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Values

SECTION B

8 **19.** Work out the answers to these questions in the space provided for rough work. Place your answers on the lines provided.

(a) Simplify:
$8x - 9y + 3y - 6x + 7 + 3x - y - 9$ ....

(b) The perimeter of a triangle is $14n$ inches and two of its sides are $3n$ inches and $5n$ inches respectively. Find the third side. ....

(c) Simplify: $5 + 3 \times 8 - 6 \div 2 =$ ....

(d) How many square yards in 108 square feet? ....

(e) $(1.03)^2 =$ ....

(f) $5\frac{1}{3} + 6\frac{2}{5} - 4\frac{1}{2} =$ ....

(g) Simplify: $6a(3a + 2b + 4) =$ ....

(h) The H.C.F. of 12 and 16 is ....

FOR ROUGH WORK

(No marks for work in this space.)

Values

20. Place your answers in their simplest form on the lines provided.

1 (a) $(-9m) + (+7m) =$ ....

1 (b) $(-11k) - (+3k) =$ ....

2 (c) $\dfrac{(4a)(-3b)(-2x)}{-6ax} =$ ....

2 (d) $5x^2 - 2x + 5x - 11x^2 =$ ....

2 (e) $(x + y)(x - y) =$ ....

2 (f) 15 is 45% of what number? ....

2 (g) 36 is what per cent of 180? ....

2 (h) Find the rate per annum at simple interest when \$350 amounts to \$392 in 2 years. ....

2 (i) On a commission of $2\frac{1}{2}\%$ how much does an agent receive for selling 6 dozen cases of dried fruit at \$22.80 a case? ....

FOR ROUGH WORK

(No marks for work in this space.)

Values

12 **21.** Select the answer from Column A which has the closest association with the item in Column B. Put the number of your selection in the brackets at the right of the item of Column B. The first one is done for you.

COLUMN A

(1) root
(2) oblique
(3) binomial
(4) taxation
(5) exponent
(6) assessment
(7) rhombus
(8) similar
(9) transversal
(10) multiple
(11) square root
(12) perpendicular
(13) congruent
(14) mill rate
(15) circumference
(16) quadrilateral
(17) formula
(18) polygon

COLUMN B

(a) The sum or difference of two terms. (...... 3 ......)
(b) A straight line cutting across two other straight lines. (..................)
(c) Perimeter of a circle. (..................)
(d) The name given to a number that satisfies the condition of an equation. (..................)
(e) A relation between the measures of two or more quantities. (..................)
(f) A many sided geometric figure. (..................)
(g) A line that is neither horizontal nor vertical. (..................)
(h) The value of property upon which taxes are based. (..................)
(i) Two geometric figures equal in all respects. (..................)
(j) Geometric figures having the same shape. (..................)
(k) One of the two equal factors of any number. (..................)
(l) A symbol that shows to what power a quantity is to be raised. (..................)
(m) The product of two or more factors. (..................)

FOR ROUGH WORK

(No marks for work in this space.)

Values

22. Place your answers on the line provided.

2 (a) Solve the formula $N = a + bc^2$ for c. ....

1 (b) If $V = \frac{4}{3}\pi r^3$, what is the effect on V of reducing r to one-third of its original value? ....

1 (c) $\sqrt{144a^4b^2} =$ ....

1 (d) $(2\frac{1}{4}x)^2 =$ ....

2 (e) 43 and 26 are approximate numbers. Find their product and round it off to the required number of significant digits. ....

FOR ROUGH WORK

(No marks for work in this space.)

Values

2 (f)

x	0	3	5	8	10	13
y	2	11	17	26		

From the information in the above table calculate the last two values of y.

2 (g) An angle of n° is the supplement of an angle of $3n^\circ$. What is the size of the larger angle?

2 (h) The coefficient of x in $4x^2y$ is

2 (i) Find the area of a parallelogram with a base of $6x$ inches and an altitude of $3x$ inches.

2 (j) What is the interest on $\$300x$ for 20 months at $5y\%$?

FOR ROUGH WORK

(No marks for work in this space.)

Values

23. Perform the required operations in the space below each question. Be sure to write your answer in its most acceptable form and place it neatly on line at the right.

3 (a) Simplify:

$$\frac{16x^3y^2 - 12x^2y + 24x^2y^3}{-4x^2y}$$

....

3 (b) If $a = -3$, $b = -2$, $c = -1$ find the value of:

$a^2bc + 2ab^2c - 3abc^2$

....

2 (c) Simplify:

$3c(7c - d) - 5c(4c + 3d)$

....

FOR ROUGH WORK

(No marks for work in this space.)

Values

3 (d) Subtract:

$$\begin{array}{r} 5xy^2 - 9x^2y + 4xy \\ -2xy^2 + 3x^2y + xy \\ \hline \end{array}$$

3 (e) Multiply:

$$\begin{array}{r} 7a - 8b \\ 4a + 6b \\ \hline \end{array}$$

2 (f) Combine into a single fraction:

$$\frac{3}{2a} + \frac{4}{3a} - \frac{6}{4a}$$

FOR ROUGH WORK

(No marks for work in this space.)

Values

24. Solve the following equations and check your answers by substitution. All your work must be shown in the space provided.

3 (a) $11m + 3 = 29 - 2m$ Check Here

5 (b) $0.3x + 5 = 0.5x + 9$ Check Here

6 (c) $\frac{3t}{5} + 2 = \frac{2t}{3} - 2$ Check Here

FOR ROUGH WORK

(No marks for work in this space.)

Values

Using ruler, pencil and compass only, carry out the constructions asked for below. Be sure to show all construction lines and draw all arcs plainly.

2 **25.** Construct a triangle ABC from the following measurements:
$AB = 3$ inches; $BC = 2$ inches; $CA = 1\frac{1}{2}$ inches

2 **26.** (a) Construct a triangle XYZ from the data:
$XY = 3$ inches; $YZ = 2\frac{1}{2}$ inches; $\angle Y = 90°$

2 (b) The distance from Y to XZ is

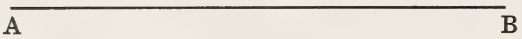
.... inches

FOR ROUGH WORK

(No marks for work in this space.)

Values

4 **27.** (a) Construct a parallelogram $ABCD$ on the base AB so that side BC is $1\frac{3}{4}$ inches long and the diagonal AC is 4 inches long.



2 (b) Find the area of parallelogram $ABCD$.

Answer .... sq. in.

FOR ROUGH WORK

(No marks for work in this space.)

Values

4 **28.** Tom purchased a transistor radio which was advertised at 20% off the regular price. He paid cash and was allowed another discount of 5%. If the original price was \$72.50, how much did he pay for the transistor?

4 **29.** In order to pay the college fees for his son Jim, Mr. Smith borrowed \$250 on a note, agreeing to pay interest at 4% per annum. After 9 months he paid back the loan in full. What amount did he pay?

FOR ROUGH WORK

(No marks for work in this space.)

Values

4 **30.** The price of a television set is $350 cash or $50 down and $315 in 10 months. If a purchaser makes his payments on the second plan what rate of interest does he pay?

FOR ROUGH WORK

(No marks for work in this space.)

Values

Algebraic solutions are required for the problems on this page.

4 **31.** One angle of a triangle is three times the smallest angle and the third angle is 40° more than three times the smallest angle. Find the angles.

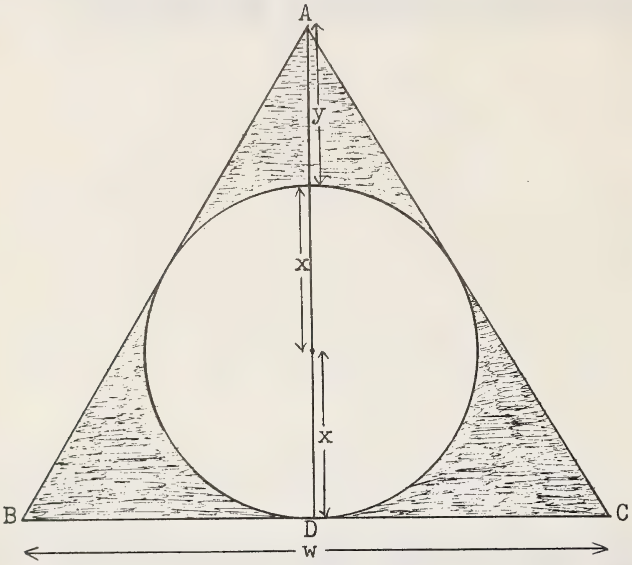
5 **32.** George has $9.00 and saves 80¢ a week. Harry has $21.00 and spends 40¢ a week. In how many weeks will the boys have equal sums of money?

FOR ROUGH WORK

(No marks for work in this space.)

Values

33. *ABC* is an equilateral triangle. *AD* is the right bisector of *BC* and the centre of the circle is on *AD*.



3 (a) Make up a formula which you would use in finding the area of the shaded part of the diagram, using lengths x, y, and w.

$A =$ ……………………………………

2 (b) Make up a formula for the length of the boundary of the shaded part, using lengths x, y, and w.

$B =$ ……………………………………

FOR ROUGH WORK

(No marks for work in this space.)

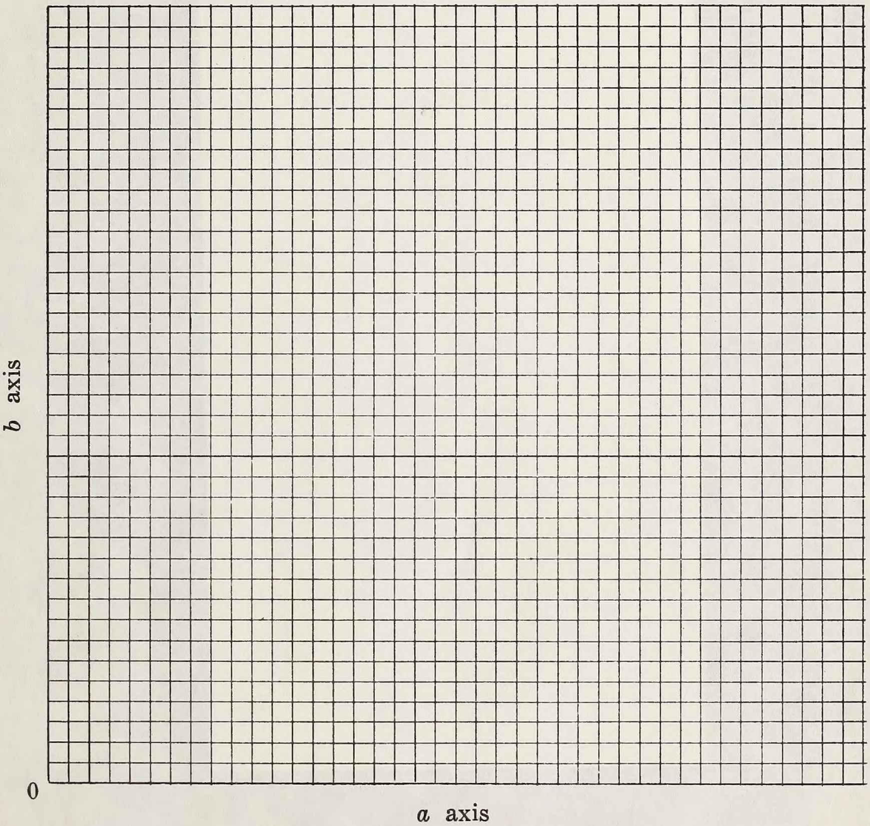
Values

34. The table below shows the related values of a and b. Examine the table and write the formula that connects a and b.

2 (a) The formula is ....

a	0	3	4	6	9	10	12	15
b	4	10	12	16	22	24	28	34

4 (b) On the graph paper below draw the graph of the formula using the table of values above. Complete the graph showing suitable scales on the vertical and horizontal axes.



4 (c) From the graph find the value of

(1) b when $a = 7$ ....

b when $a = 11$ ....

(2) a when $b = 6$ ....

a when $b = 29$ ....

FOR ROUGH WORK

(No marks for work in this space.)

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